

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (Currently amended): A system for storing and retrieving elemental hydrogen, said system comprising:

a housing;

at least one passage connected to said housing for conducting hydrogen gas into and conducting hydrogen gas out of said housing;

a hydrogen storage member enclosed within said housing, said hydrogen storage member comprising a mass of porous silicon having interior and exterior surfaces, at least said interior surfaces having dangling bond sites at which reversible chemisorption of hydrogen atoms occurs;

releasing means for causing said chemisorbed hydrogen atoms to be liberated from said dangling bond sites to be released as hydrogen gas from said housing through said at least one passage, wherein said releasing means is selected from the group consisting of light sources, current sources, voltage

sources, and combinations thereof; and

a control unit comprising means for receiving inputs indicative of operating parameters of said system, and means for issuing outputs that control said releasing means.

Claim 2 (Currently amended): A system in accordance with claim 1 wherein at least said interior surfaces of said porous silicon have dendritic spikes or non-conformal growth formed by an additive silicon deposition process. ~~etched pits.~~

Claim 3 (Previously presented): A system in accordance with claim 1 wherein said at least interior surfaces are bare silicon surfaces at which said dangling bond sites are exposed.

Claim 4 (Original): A system in accordance with claim 1 comprising a plurality of said hydrogen storage members.

Claim 5 (Previously presented): A system in accordance with claim 1 wherein said porous silicon defines a layer within at least a first surface

portion of said hydrogen storage member.

Claim 6 (Original): A system in accordance with claim 5 wherein the percent void volume of said surface layer is about 50%.

Claim 7 (Previously presented): A system in accordance with claim 5 further comprising electronic integrated circuits on a second surface portion of said hydrogen storage member.

Claim 8 (Currently amended): A system for storing and retrieving elemental hydrogen, said system comprising:

a housing;

at least one passage connected to said housing for conducting hydrogen gas into and conducting hydrogen gas out of said housing;

a hydrogen storage member comprising a porous mesh of crystalline silicon columns having diameters of about 1 nanometer and silicon surfaces with dangling bond sites at which reversible chemisorption of hydrogen atoms occurs; and

means for liberating said chemisorbed hydrogen atoms from said

dangling bond sites and releasing said liberated hydrogen atoms as hydrogen gas from said housing through said at least one passage.

Claim 9 (Previously presented): A system in accordance with claim 8 wherein said silicon columns have surfaces on the (111) plane.

Claim 10 (Previously presented): A system in accordance with claim 8 wherein said silicon columns are formed by extrusion of molten silicon to have surfaces on the (111) plane.

Claim 11 (Previously presented): A system in accordance with claim 10 wherein said silicon columns are extruded through at least one aperture that is an integral multiple of the lattice spacing of silicon such that said silicon columns have a minimum energy configuration suitable for forming a crystal.

Claim 12 (Canceled)

Claim 13 (Previously presented): A system in accordance with

claim 12 wherein said silicon columns have cross-sectional shapes selected from the group consisting of triangle, rhombus, square, and circle.

Claim 14 (Previously presented): A system in accordance with claim 10 wherein said silicon columns have roughened surfaces.

Claim 15 (Previously presented): A system in accordance with claim 8 further comprising a control unit comprising means for receiving inputs indicative of operating parameters of said system, and means for issuing outputs that control said liberating means.

Claim 16 (Currently amended): A system in accordance with claim 15 wherein said liberating ~~releasing~~ means is selected from the group consisting of light sources, current sources, voltage sources, and combinations thereof, and said liberating means liberates said chemisorbed hydrogen atoms from said dangling bond sites by passing photonic energy through said porous mesh, passing electrical current through said porous mesh, or creating an electrical field across said porous mesh.

Claim 17 (Previously presented): A system in accordance with claim 1, wherein said releasing means comprises a light-emitting diode.

Claim 18 (Previously presented): A system in accordance with claim 1, wherein said releasing means comprises a light source that emits photon energy at a wavelength of about 660 nanometers and transmits said photon energy through said porous silicon and onto said interior surfaces of said porous silicon to liberate said chemisorbed hydrogen atoms from said dangling bond sites on said interior surfaces.

Claim 19 (Previously presented): A system in accordance with claim 1 wherein said porous silicon is in a monocrystalline form.

Claim 20 (Previously presented): A system in accordance with claim 19 wherein said porous silicon is formed in a silicon wafer.

Claim 21 (Previously presented): A system in accordance with claim 1 wherein said porous silicon is in a polycrystalline form.

Claim 22 (Previously presented): A system in accordance with claim 1 wherein said porous silicon has been treated by a process selected from the group consisting of crushing, milling, treatment with hydrofluoric acid and methanol in the presence of electric current, treatment with potassium hydroxide, treatment with hydrazine, wet etching, dry etching, deposition of a noble metal such as palladium or platinum, conformal vapor deposition of silicon, and non-conformal vapor deposition of silicon.

Claim 23 (Previously presented): A system in accordance with claim 1 wherein said porous silicon is derived from molten silicon by crystallization.

Claim 24 (Previously presented): A system in accordance with claim 1 wherein said porous silicon is derived from silicon waste obtained from a silicon process waste stream.

Claims 25-37 (Canceled)

Claim 38 (Currently amended): A system in accordance with claim

1, wherein said releasing means ~~is selected from the group consisting of light sources, current sources, voltage sources, and combinations thereof~~ liberates said chemisorbed hydrogen atoms from said dangling bond sites by passing photonic energy through said porous silicon, passing electrical current through said porous silicon, or creating an electrical field across said porous silicon.

Claim 39 (Previously presented): A system in accordance with claim 1, wherein said control unit further comprises means for controlling the silicon activation energy of hydrogen on said porous silicon of said hydrogen storage member.

Claim 40 (Previously presented): A system in accordance with claim 15, wherein said control unit further comprises means for controlling the silicon activation energy of hydrogen on said porous mesh of crystalline silicon columns of said hydrogen storage member.

Claim 41 (New): A system in accordance with claim 1, wherein said interior surfaces of said porous silicon has feature sizes of about one nanometer.

Claim 42 (New): A system in accordance with claim 1, wherein said interior surfaces of said porous silicon further comprise etched pits therein.

Claim 43 (New): A system in accordance with claim 1, wherein said releasing means is disposed on the mass of porous silicon.

Claim 44 (New): A system in accordance with claim 1, wherein said releasing means comprises a light source that liberates said chemisorbed hydrogen atoms from said dangling bond sites by passing photonic energy through said porous silicon.

Claim 45 (New): A system in accordance with claim 1, wherein said releasing means comprises a current source that liberates said chemisorbed hydrogen atoms from said dangling bond sites by passing electrical current through said porous silicon.

Claim 46 (New): A system in accordance with claim 1, wherein said releasing means comprises a voltage source that liberates said chemisorbed hydrogen atoms from said dangling bond sites by creating an electrical field

across said porous silicon.

Claim 47 (New): A system in accordance with claim 8, wherein said liberating means comprises a light source that liberates said chemisorbed hydrogen atoms from said dangling bond sites by passing photonic energy through said porous mesh.

Claim 48 (New): A system in accordance with claim 8, wherein said liberating means comprises a current source that liberates said chemisorbed hydrogen atoms from said dangling bond sites by passing electrical current through said porous mesh.

Claim 49 (New): A system in accordance with claim 8, wherein said liberating means comprises a voltage source that liberates said chemisorbed hydrogen atoms from said dangling bond sites by creating an electrical field across said porous mesh.